

EXCISION OF THE TARSAL BONES.¹

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DISEASE of the tarsal bones is not an uncommon occurrence among children who apply for admission into hospitals. The following paper is based upon the cases of nine patients operated upon at St. Mary's Free Hospital for Children. Although there is nothing very noteworthy in any of the cases taken individually, yet, when taken together, they form a group from which one may draw a few practical deductions.

The following plan of operation was followed in all but one case, to which reference will be made further on: After rendering the limb bloodless by an Esmarch bandage, if the *os calcis* is to be removed, an incision is made from a point corresponding to the inner edge of the *tendo Achillis* and about an inch above its insertion, outward and then forward on the outer aspect of the foot to a point midway between the external malleolus and the proximal end of the fifth metatarsal bone, the incision being made directly down to the bone. The only tendons denuded are the *tendo Achillis* and that of the *peronaeus longus* where it passes over the lateral surface of the *os calcis*. No vessel of any size requiring ligature is divided. The incision will be found to afford plenty of room. The periosteum is then divided and separated from the bone as far as possible with an elevator; it will then be found that the bone can be removed either as a whole or in pieces, the ligaments being divided as they present themselves. After removing all the bone and well washing out the cavity left by the operation, the constricting bandage is removed, and any bleeding points are secured. The edges of the incision are brought together with silver wire, except at the posterior part of the wound, which is

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left for a drainage-tube. I use silver wire because, in my experience, it is often necessary to hold the parts in coaptation longer than can be done with catgut. The foot is usually put up in a tin leg-splint, with a foot-piece at right angles to the leg. The cavity left after the removal of the bone is in some cases swabbed out with chloride of zinc, in others dusted over with iodoform. None were put up in a permanent dressing. The following is an abstract of the cases:

CASE I. F. M., aet. 3, came to the hospital in 1874. She was an unhealthy-looking child. There was a large sinus, from which there was a considerable discharge, situated upon the dorsal aspect of the right foot, over the upper border of the cuboid bone. There was also disease of the first metacarpal bone of the left hand. In September, 1874, the patient was etherized, and the disease was found to be confined to the *os calcis*. This was freely gouged so as to remove all diseased bone. The portion left seemed hard, and was supposed to be healthy. In January, 1875, as the wound did not close, more diseased bone was removed. In April, as the foot was no better, an incision was made by splitting the *tendo Achillis* and then extending the incision forward upon the plantar surface of the foot, so as to afford room to remove the remains of the *os calcis*. The cavity thus left was stuffed with lint. The wound gradually filled up, and she was discharged with her foot in good condition, the heel somewhat flattened and with a deep cavity behind.

November 1, 1885, eleven years after the operation. Upon examination it was found that the foot was in good condition. There had been no return of disease, no pain about the foot, and the child walked with but a very slight limp, scarcely perceptible. The heel, where there had been a deep depression at the time of her discharge, had now filled out, so that the point of excision was represented by a mere line occupying the posterior rather than the plantar aspect of the foot. The contour of the heel had filled out. There was an obliteration of the plantar arch. I do not think that there had been any reproduction of bone.

CASE II. M. D., aet. $3\frac{1}{2}$, had had disease of the *os calcis* for some time. The bone had been gouged twice before the patient came to the hospital, but without any permanent relief. He was a healthy-looking boy. There was a sinus on the external aspect of the foot over the *os calcis*, through which diseased bone could be detected. In February, 1879, the old line of incision was reopened. There was

found a sinus in the os calcis leading to a cavity in which was a loose piece of bone of about the size of a filbert. The walls of this cavity were smooth and hard. The necrosed bone was removed and the wound closed, in the expectation that, the cause of irritation being removed, recovery would take place; but after a time the parts assumed the same condition that had existed before the operation. In May the bone was excised. It was found harder than normal. After the last operation the patient made a good recovery, and was discharged, walking well. He has not been seen since his discharge from the hospital.

CASE III. M. R., *aet. 7*, was admitted in February, 1879. Three months previous she began to complain of pain in the heel of the right foot. It then began to swell, and three weeks before she came under observation an abscess opened posteriorly, and had continued to discharge since. Diseased bone could be detected with the probe. In March the os calcis was removed. It was found entirely diseased. She was discharged from the hospital in June, able to walk. She was seen November 20, 1885. She then walked well, with scarcely a limp, had had no pain, and the old line of incision had not reopened. About one year ago, five years after she left the hospital, an abscess formed on the dorsal aspect of the foot, and has continued to discharge ever since. There is now a sinus at this point. The patient seems healthy, and experiences no inconvenience from the foot. I presume there is diseased bone. There has been some reproduction of the os calcis.

CASE IV. Sarah J., four years before admission, received a cut on the plantar surface of her right foot from a piece of glass. The wound had never closed. Three years ago some diseased bone had been removed, and since then several small pieces had come away. In November, 1879, the os calcis was removed. The bone was extensively diseased. In February she was discharged, able to walk well. A week after her discharge she was brought to the hospital with a superficial abscess about the point of operation, caused, it was said, by walking with a badly fitting shoe. She was sent home in a few days. In May, 1883, her friend reported that she had had no further trouble, and that she walked well.

CASE V. C. R., *aet. 10*, came to the hospital in March, 1881, with the following history: Six months before, without any known cause, a swelling had appeared at the back of the heel; an abscess had formed and opened, and had continued to discharge ever since. The os calcis was removed, and was found to be much diseased. He was sent home

in June with a useful foot. He was seen November 20, 1885. There has been no change in the foot since he left the hospital; he can walk well, with but little, if any, limp, and is now employed as an errand boy in an apothecary's shop. There is, however, limited motion at the ankle-joint. There does not appear to have been any new bone formed.

CASE VI. Peter H., an unhealthy-looking boy, $\text{æt. } 6$, was admitted in September, 1881. He had disease of the right *os calcis*, and carious bone in various portions of his body. In October the *os calcis* was removed. He did well for a time, then his foot began to swell, the old line of incision opened, and he was in a worse condition than before the operation. Other tarsal bones became involved in the disease. The bones were gouged, but with no improvement. In March, 1883, Syme's amputation was performed. The flap did well for a time, but finally sinuses began to form, and he was removed from the hospital. On examining the parts after their removal, there was found considerable reproduction of bone.

CASE VII. K. A., $\text{æt. } 3$, was admitted in January, 1882, with disease of the *os calcis* of some duration. The bone was removed in February, 1882. She was discharged April 20, with the wound all closed, and able to walk well. Nothing has been heard from her since she left the hospital.

CASE VIII. Joseph M., $\text{æt. } 6$, came under observation in February, 1882, with a history of disease of the bones of the left foot of some duration. There was a sinus over the astragalus through which carious bone could be detected. The foot was much swollen. On March 20, 1882, the sinus over the astragalus was enlarged, and that bone removed by gouging. It was then found that the anterior portion of the *os calcis* was diseased. The anterior two-thirds were removed through an incision on the external aspect of the foot, leaving the posterior portion of that bone. The foot did well for a time, the anterior wound closing, but a sinus persisted posteriorly. In October, as the portion of the *os calcis* left was evidently diseased, it was removed. After this the wound closed, and he was discharged with a sound and useful foot. He has not been heard from since.

CASE IX. Edward L., $\text{æt. } 2\frac{1}{2}$, was admitted in September, 1882, with an extensive swelling on either side of the left ankle-joint. Fluctuation was marked. He had been lame for some months. The abscess in the ankle-joint was opened under ether, and the lower end of the tibia and the articular surface of the astragalus were found denuded

of cartilage. The diseased bone was gouged and the joint drained. The abscess continued to discharge for some time, and then the sinus closed about the ankle-joint, but a new opening formed over the anterior surface of the astragalus in front of the ankle-joint. Subsequently the astragalus and the os calcis, which were found diseased, were removed. At the time of the operation there was no disease about the end of the tibia, and the bone was well covered. The patient was discharged from the hospital with a useful foot, all sinuses being closed. November 19, 1885, he was seen at the hospital. He has had no trouble with the foot since. Can walk well with a slight limp. The end of the tibia occupies a lower plane than that of the sound limb, so that the ankle-joint is depressed. There has been some reproduction of bone.

Of these nine cases the os calcis was alone removed in seven, the os calcis and astragalus were removed in two. A useful foot was obtained in eight, and in one amputation had to be performed. In but one of these eight cases has there been any return of the disease in the other tarsal bones, and in this not until five years after the operation. All but three of the patients have been seen or heard from within the past year, and in all, with but one exception, has the foot continued in good condition, and the patient been able to walk and be about with other children without any inconvenience except a slight limp. In all there has been an obliteration of the plantar arch, with a tendency to walk upon the inner border of the foot. All complain that the inner side of the shoe is worn out first, but there has been no pain.

In regard to a partial removing or gouging of the os calcis for disease, my own experience has not been flattering. Although a faithful trial of this procedure was made in four cases, no permanent cure was obtained, and only after total extirpation of the diseased bone did the sinus close. In one case the bone had been operated upon three years before the patient's admission, with no apparent benefit.

Case II, where there existed a sinus leading into the centre of the os calcis, in which was imprisoned a loose piece of dead bone, seemed very favorable for such an operation, yet it failed to stop the disease, and a total excision of the bone had finally to be performed. In another case the posterior third of the os

calcis was left, as it was apparently healthy, but recovery did not take place until this, too, had been removed. I am well aware that others have obtained good results from partial excision or gouging, but perhaps it was in older subjects and under more favorable circumstances. My own experience is entirely opposed to a partial operation in children. Perhaps one cause of the want of success in these cases is the fact that the bone was sclerosed and incapable of filling up the cavity left by gouging.

I have never made a resection of the ankle-joint in children, although I have seen some cases of disease of this articulation—I mean in which the lower end of the tibia and fibula was extensively diseased. The patients made a good recovery.

DISCUSSION.

Dr. H. B. Sands said that it seemed to him that a distinction must be drawn between tubercular inflammation and osteomyelitis of the os calcis. So far as he had been able to judge while listening to the paper, Dr. Poore had reported only one case of true necrosis of the bone. In this there was a cavity with healthy walls, inclosing a piece of dead bone, which was removed by operation because the cavity would not close. It was further stated that in this case when the os calcis was removed it was found to be firmer than normal, which would imply that it was not carious, and that the previous failure to obtain a cure was, as Dr. Poore had intimated, due to a refusal on the part of the bony cavity to fill up. The speaker doubted the necessity of removing the whole os calcis in cases of necrosis unless the necrotic process involved the entire bone, the indication being to remove only the loose sequestra. He recalled a case which had occurred about fifteen years before in a lad *aet. 10*, who was supposed, by the late Dr. Van Buren, the late Dr. Parker, and himself, to be suffering from caries of the tarsus. There were several sinuses in the foot, and it was advised that the foot should be amputated. But an exploratory incision was made, and the os calcis was found to be a shell, containing a large number of pieces of dead bone within a cavity which had a smooth lining, such as was usually found in bones containing necrotic tissue. The pieces of dead bone were removed, and, although the walls of the os calcis were exceedingly thin, the cavity filled up within a few months, and the wound healed. He had not had much experience in dealing with the os calcis in children, but he thought that in adults partial excisions were often successful. He was somewhat surprised

to learn that caries was so often limited to the os calcis. His own experience had been that this disease was apt to attack the astragalus and scaphoid, and other bones of the tarsus, rather than the calcaneum alone. He thought the tendency nowadays was to avoid excisions in cases of caries, and that the use of the gouge, or sharp spoon, as it was called, often gave satisfactory results. He believed that in one of the children presented the condition of the foot corroborated the statement which he had made a month ago—that after the removal of a large portion of the tarsal bones, provided the periosteum was left, considerable reproduction would occur. It was evident in that case that, although the entire os calcis had been removed, there had been a considerable reproduction of bone. It seemed to him to be a point worthy of consideration whether, in caries, excision should be preferred to an operation which was partial, and which aimed to remove only the diseased tissues. It might occur, however, that, if a large part of the interior of the os calcis was removed, the space would remain open, although much might be done to overcome that difficulty by nailing down the soft parts or fastening them by deep sutures. He was willing to admit, however, that the results obtained in Dr. Poore's cases had been excellent.

Dr. Poore said that in almost all the cases he had reported the patients were in the hospital for a long time, and that where gouging had been performed the interval between the gouging and the excision was in some cases a year at least. He had given the patients all the chances of recovery he could, but, as suppuration had continued, the condition of the tarsus had not improved, and small pieces of bone had worked out, he had resorted to excision.

Dr. Sands asked if it was good practice to leave a case for a year after an operation. Was it not rather desirable to follow one operation by another, with a view to removing all the diseased tissue as quickly as possible?

Dr. Poore said he had performed gouging in one case four times within a year. He had been very much disappointed in this operation. He had certainly expected to see some patients get well after it, but he had never seen such a result. It might be because he had dealt with young children, the patients having been mostly under four years of age.

Dr. Lange recalled a very limited number of cases of tuberculous affections of the os calcis and astragalus in which the disease had been so limited that it had not been necessary to remove the bones entire. He had had one such case where the principal seat of the disease was in the bones of the ankle-joint. There was also a tuberculous seque-

trum in the *os calcis*, which was removed, and the entire shell of the bone left, and finally recovery took place. He thought that in a good many cases of tuberculous necrosis recovery would eventually take place after the removal of sequestra and scraping. It seemed to him that in Dr. Poore's cases a striking point was the difference between the reproduction of the *os calcis* and that of the *astragalus*; there had not been a reproduction of the *astragalus*. In some of his own cases of total excision of the ankle-joint he had observed the same thing, and probably it had been this which had caused the amount of shortening in Dr. Poore's cases. He had twice excised the tarsal bones during his service in Bellevue Hospital, the first and second rows, and in one instance cut away also the surface of the *os calcis* and *astragalus*; in the other the extirpation was not so extensive, but the result was a good one, although the patient was an adult. The result in the first case he could not give, for the patient was removed from the hospital because she refused to submit to a secondary operation. The results of other surgeons were rather encouraging for operative interference—for instance, those reported by Neuber some years ago.